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Group Art Unit: 2812

REMARKS

Claim Rejections - 35 USC §103

Claims 1-30 and 33-35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Weidman et al. (U.S. Appl. Pub. No. 2003/0176058, hereinafter "Weidman") in view of Wang et al. (U.S. Appl. Pub. No. 2005/0110152, hereinafter "Wang").

Regarding independent claims 1, 9, and 20, Applicants respectfully traverse the rejections since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Weidman or Wang of:

"patterning the intermetal dielectric layer and hard mask layers, and etching to form via openings extending through the intermetal dielectric layer and the hard mask layers;" [underlining for clarity]

The Examiner states:

"Weidman shows the method as claimed in figures 1A-1H and corresponding text... The hard mask and IMD layers are patterned and etched to form open via and trench openings (figs. 1E-1H) for subsequent conducting metal fill." [deletions and underlining for clarity]

However, it is respectfully submitted that Weidman FIG. 1E shows the via opening 50 extending only partially through dielectric layer 10. It is not until subsequent processing in FIG. 1G that the via opening (no number) extends through the dielectric layer 14. Thus, claims 1, 9, and 20 are allowable under 35 U.S.C. §103(a) as being patentable over Weidman in view of Wang because:

"[T]he prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." [Bold for clarity] *In re Vaeck*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

Applicants also respectfully traverse the rejections of claims 1, 9, and 20 since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Weidman or Wang of:

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"forming a layer of via-fill material of bottom anti-reflective coating with photoresist over the intermetal dielectric layer, the via-fill material filling the via openings;" [underlining for clarity]

The Examiner states:

"Weidman lacks anticipation only in not explicitly teaching that the BARC is formed with photoresist and that the via is filled with photoresist;"

However, it is respectfully submitted that Weidman FIGs. 1E-1H show that a BARC is not and cannot be used to fill the via opening without interfering with the Weidman process. Weidman uses the Weidman BARC (antireflective layer) 40 only used to fill the Weidman opening 32 before any portion of the Weidman via 50 is formed.

The Examiner continues:

"Wang teaches, in a similar process, a dual damascene structure is formed using a coating is also used to fill the opening and that a second photoresist covers the BARC (fig. 224) (*sic*)..."

It would have been obvious to one of ordinary skill in the art to have had formed the BARC layer of photoresist and to have filled the via openings with photoresist, in the method of Weidman."

However, it would be obvious to those having ordinary skill in the art that filling the via in Weidman with Wang photoresist would have rendered the Weidman process inoperative because the Weidman etching step for completing the via could not be performed. Thus, claims 1, 9, and 20 are allowable under 35 U.S.C. §103(a) as being patentable over Weidman in view of Wang because the references teach away from the combination:

"We have noted elsewhere, as a "useful general rule," that references that teach away cannot serve to create a *prima facie* case of obviousness... If references taken in combination would produce a "seemingly inoperative device", we have held that such references teach away from the combination and thus cannot serve as predicates for a *prima facie* case of obviousness." *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984)[deletion for clarity]

Applicants also respectfully traverse the rejections of claims 1, 9, and 20 since the Applicants' claimed combination, as exemplified in claim 1, includes the limitation not disclosed in Weidman or Wang of:

"patterning the via-fill material, intermetal dielectric layer and hard mask layers, and etching to form trench openings;" [underlining for clarity]

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The Examiner previously states:

"Weidman shows the method as claimed in figures 1A-1H and corresponding text... The hard mask and IMD layers are patterned and etched to form open via and trench openings (figs. 1E-1H) for subsequent conducting metal fill." [deletions and underlining for clarity]

However, since there is no Weidman via-fill material and the Wang via-fill material would render Weidman inoperative, any Weidman via-fill material cannot be patterned and etched to form the trench openings. Thus, claims 1, 9, and 20 are allowable under 35 U.S.C. §103(a) as being patentable over Weidman in view of Wang because of *In re Vaeck, supra*.

The dependent claims 2-8 and 33 depend from independent claim 1, dependent claims 10-19 and 34 depend from claim 9, and dependent claims 21-30 and 35 depend from claim 20 and are believed to be allowable since they contain all the limitations set forth in the independent claims from which they depend and claim non-obvious combinations thereof.

Based on all of the above and the differences in the processes between the claimed invention and Weidman in view of Wang, it is respectfully submitted that claims 1-30 and 33-35 are allowable because the US Supreme Court has held:

"[A] process patent can only be anticipated by a similar process. A mechanical patent is anticipated by a prior device of like construction and capable of performing the same function; but it is otherwise with a process patent." Carnegie Steel Co. v. Cambria Iron Co., 185 U.S. 403 (1902).

Response to Arguments

The Examiner stated that Applicants' arguments filed February 10, 2006 have been fully considered but they are not persuasive.

Applicants respectfully submit that the Applicants' arguments have been clarified to show that there are a number of different reasons that the claimed invention is not obvious based on Weidman in view of Wang.

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Conclusion

In view of the above, it is submitted that the claims are in condition for allowance and reconsideration of the rejections is respectfully requested. Allowance of claims 1-30 and 33-35 at an early date is solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including any extension of time fees, to Deposit Account No. 50-0374 and please credit any excess fees to such deposit account.

Respectfully submitted,



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